This Study included synthesis and characterization three new derivatives of 1,3,4 thiadiazole , and its coordination complexes , as follows

Equal moles reaction of thiosemicarbazaide with carbon disulfide in the presence of potassium hydroxide tosynthesis the compound 5-amino-1,3,4- thiadiazole -2- thiol , which was used in the synthesis of ligands, where equal moles of the compound are mixed 5-Amino-1,3,4-thiadiazole -2- thiol With 1H- pyrrole-2- carbaldehyd to synthesize the first ligand .

(E)-5-(((1H-pyrrol-2-yl)methylene)amino)-1,3,4-Thiadiazole-2-thiol

in the same way, the third ligand was prepared from the reaction 5-amino - 1,3,4- thiadiazole -2- thiol 5- with (hydroxymethyl) Furan-2-carbaldehyde

(E) - (5- (((5-mercapto-1,3,4-thiadiazol-2-yl)imino)methyl)furan-2-yl) methanol

Then, one mole of hydrazine hydrate was reacted with two moles of carbon disulfide in the presence of potassium hydroxide to synthesize the compound 2,5- dithiol- 1,3,4- thiadiazole then equal moles of the compound were reacted 2,5- dithiol- 1,3,4- thiadiazole with hydrazine hydrate to remove(SH) group and replace it with a group ($NH-NH_2$) to form the compound 5- Hydrazenyle- 1,3,4- thiadiazole -2- thiol which was used in the synthesis of the second ligand after interacting with 4-Hydroxy benzaldehyde to produce (E)-4-((2-(5-mercapto-1,3,4-thiadiazol-2- yl)hydrazineylidene)methyl) Phenol, As in the following diagram

: